Small Business Innovation Research/Small Business Tech Transfer

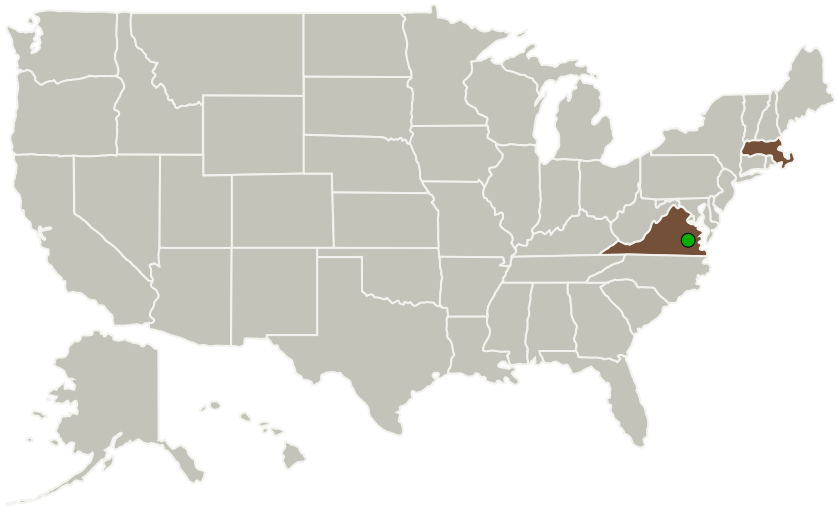
Asynchronous Sensor fuSion for Improved Safety of Air Traffic (ASSIST), Phase I

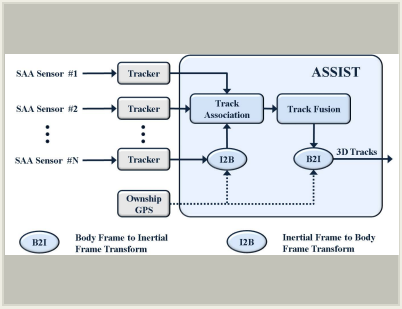
Completed Technology Project (2014 - 2014)

Project Introduction

SSCI proposes to develop, implement and test a collision detection system for unmanned aerial vehicles (UAV), referred to as the Asynchronous Sensor fuSion for Improved Safety of air Traffic (ASSIST). The ASSIST system is robust to ADS-B spoofing, and will associate the EO/IR and airborne radar (ABR) tracks generated onboard the UAV with those generated by the ground-based radar (GBR) to minimize false tracks generated by EO/ABR due to clutter. Under this project, we plan to leverage our FORECAST technology (Fast On-line pREdiCtion of Aircraft State Trajectories) that fuses the ground-based radar information with airborne radar and transponder data to achieve accurate track generation and efficient prediction of potential NMACs in a high-density airspace. We will also leverage our SAFESEE (Sense and Avoid using Fusion and Expansion SEgmEntation) technology - a collision detection system that uses pixel-level fusion of EO/IR optical-flow features to achieve robust probability of detection and low FAR under realistic operating conditions. SAFESEE has been recently flight tested at the Air Force Bombing Range at Avon Park, FL. Under our FORECAST project we developed a capability of simulating communication delay between the ground station and the UAV. We plan to extend this capability and carry out a study of effects of the communication delay on the ASSIST system. Specific Phase I tasks include: (i) Acquire target tracks and FAR related to existing capabilities from NASA; (ii) Develop, implement and test the ASSIST system; and (iii) Carry out a trade study of the effect of the communication delay on the ASSIST system. In Phase II we plan to carry out extensive analysis and simulation testing of the ASSIST system, and arrive at a flight testing plan for the continuation of the work beyond Phase II.

Primary U.S. Work Locations and Key Partners





Asynchronous Sensor fuSion for Improved Safety of air Traffic (ASSIST) Project Image

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Organizations Performing Work	Role	Type	Location
Scientific Systems Company, Inc.	Lead Organization	Industry Small Disadvantaged Business (SDB)	Woburn, Massachusetts
Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations	
Massachusetts	Virginia

Project Transitions

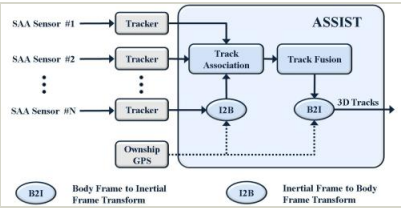
June 2014: Project Start

December 2014: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140722)*

Images



Project Image
Asynchronous Sensor fuSion for Improved Safety of air Traffic (ASSIST) Project Image *(https://techport.nasa.gov/image/136476)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Scientific Systems Company, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

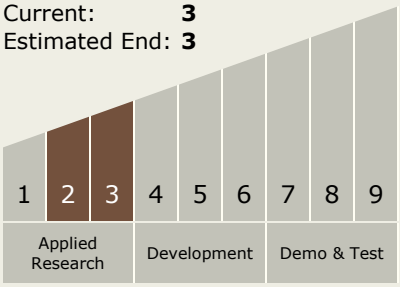
Carlos Torrez

Principal Investigator:

Jovan Boskovic

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



Asynchronous Sensor fuSion for Improved Safety of Air Traffic (ASSIST), Phase I

Completed Technology Project (2014 - 2014)

Technology Areas

Primary:

- TX11 Software, Modeling, Simulation, and Information Processing
  - TX11.3 Simulation
    - TX11.3.1 Distributed Simulation

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System